1 of 3 #9/appeal Brief

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In the United States Patent and Trademark Office
Board of Patent Appeals and Interferences

In re Application of:

Michael J. Siwinski

Method For Saving Power In An Organic Electroluminescent Display Using White Light Emitting Elements

Serial No. 09/874,128

Filed June 5, 2001

Group Art Unit: 2675

Examiner: Leland R. Jorgensen

I hereby certify that this correspondence was sent by facsimile transmission to the United States Patent and Trademark Office on the date set forth below.

Valerie J. Richardson

Valerie J. Richardson

May 10, 2004

Date

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF TRANSMITTAL

Enclosed herewith in triplicate is Appellants' Appeal Brief for the above-identified application.

The Assistant Commissioner is hereby authorized to charge the Appeal Brief filing fee to Deposit Account 05-0225. A duplicate copy of this letter is enclosed. While not believed necessary, the Assistant Commissioner is also authorized to charge any extension of time fee deemed to be required for filing of the Appeal Brief to such Deposit Account.

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Respectfully submitted,

Attorney for Appellants
Registration No. 33,564

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Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF PURSUANT TO 37 C.F.R. 1.192

Applicants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of claims 1-10 which was contained in the Office Action mailed December 3, 2003.

A timely Notice of Appeal was mailed, with certification of First Class mail, March 3, 2004, and received in the USPTO mail room March 8, 2004.

Respectfully submitted,

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Table Of Contents

Real Party In Interest

The Eastman Kodak Company is the assignee, and the real party in interest.

Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

Status Of The Claims

Claims 1-10 are pending in the application.

Claims 1-10 stand rejected under 35 USC § 112.

Claims 1-10 stand rejected under 35 USC § 103.

Claims 1-10 are being appealed.

Appendix I provides a clean, double spaced copy of the claims on appeal.

Status Of Amendments

An Amendment After Final was mailed February 3, 2004, requesting amendments to claims 9 and 10 and reconsideration of the Final Rejection dated December 3, 2003. An Advisory Action dated March 4, 2004 refused entry of the amendment after final, the Examiner indicating the proposed amendment was not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal, as the proposed amendments to claims 9 and 10 were deemed to make technical changes so that such claims essentially track limitations already in claims 1 and 5, and that such changes would make little difference in the rejections or analysis of the rejections. The Examiner further stated that the request for reconsideration has been considered, but does not place the application in condition for allowance.

Summary Of The Invention

Applicant's invention, as disclosed in the specification and claimed, is directed to a power saving method (independent claim 1) and color organic electroluminescent display (30) (independent claim 5) that save power by providing the display with colored light emitting elements (12, 14, 16) and white light emitting elements (18), where the white light emitting elements have light emitting efficiencies greater than at least one of the colored light emitting elements, converting (image processor 42) at least a portion of a color digital image to a monochrome image, and displaying (display driver 44) the monochrome portion of the image using only the white light emitting elements of the display. The light emitting efficiency measure relates to the amount of light output produced for a given amount of current, such as may be reported in the units of candelas/ampere (specification at page 3, lines 19-25). Applicant's invention as further defined in independent claim 9 is directed to an OLED device (32) that has a pixel site including a plurality of individually addressable light emitting elements (12, 14, 16, 18) including a light emitting element (18) for emitting white light and one or more light emitting elements (12, 14, 16) for emitting colored light, and the white light emitting element being at least twice as efficient as at least one of the colored light emitting elements; and in independent claim 10 is directed to a method of saving power in an OLED display device (32) that includes providing an OLED display (30) having pixel sites with colored light emitting elements (12, 14, 16) and white light emitting elements (18), the white light emitting element being at least twice as efficient as at least one of the colored light emitting elements, converting (image processor 42) at least a portion of a digital color image signal to a power saving digital image signal using the white light emitting elements, and driving (display driver 44) the OLED display with the power saving digital image signal. While claims 9 and 10 do not explicitly refer to light emitting efficiency, it is clear, in view of the specification (e.g., specification at page 3, lines 19-25), that the term "efficiency" used therein is directed towards light emitting efficiency.

Issues For Review By The Board

There are 4 issues presented for review by the Board of Patent Appeals and Interferences:

1. Are Claims 1-10 properly rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention?

2. Are Claims 1, 4, 5, and 8-10 properly rejected under 35 USC 103(a) as being unpatentable over Shimizu et al. (US 6,069,440), in view of Hill, Jr. (US 5,790,096), and Xu et al. (US 6,133,692)?

3. Are Claims 2 and 6 properly rejected under 35 USC 103(A) as being unpatentable over Shimizu et al. (US 6,069,440), in view of Hill, Jr. (US 5,790,096), and Xu et al. (US 6,133,692), and further in view of Shimoda (US 5,944,829)?

4. Are Claims 3 and 7 properly rejected under 35 USC 103(a) as being unpatentable over Shimizu et al. (US 6,069,440), in view of Hill, Jr. (US 5,790,096), and Xu et al. (US 6,133,692), and further in view of Nelson et al. (US 6,311,282 B1)?

Grouping Of Claims

Claims 1-8 will stand or fall as a first group with respect to Issue No. 1; and claims 9 and 10 will stand or fall as second group with respect to Issue No. 1.

Claims 1, 4, 5 and 8 will stand or fall as a first group with respect to Issue No. 2; Claims 9 and 10 will stand or fall as second group with respect to Issue No. 2.

Claims 2 and 6 will stand or fall as a group with respect to Issue No. 3.

Claims 3 and 7 will stand or fall as a group with respect to Issue No. 4.

Arguments

The Rejection of Claims 1-10 under 35 USC § 112

Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner states that Claims 1, 5, 9, and 10 use the term efficiency without defining the term either in the specification or in the claims, and that at least four types of efficiency is described in

the literature. In addition, the Examiner states that the eye is more sensitive to certain colors such as green and white as compared to blue or red and thus white light can be described as more efficient than blue or red light since the eye is more sensitive to white light. The remaining claims are rejected as dependent on rejected independent claim 1 or 5. This rejection is respectfully traversed.

With respect to the rejection of Claims 1-8, independent Claims 1 and 5 are directed towards the use of organic electroluminescent displays having colored light emitting elements and white light emitting elements, where the white light emitting elements have light emitting efficiencies greater than at least one of the colored light emitting elements. Such light emitting efficiency measure is further explained in the specification at page 3, lines 19-25 as being the amount of light output produced for a given amount of current, such as may be reported in the units of candelas/ampere. Thus, contrary to the Examiner's assertions, the term efficiency as used in such claims is clearly directed towards light emitting efficiency, as is defined in the present application. The Examiner's Advisory Action mailed March 4, 2004 acknowledges that Applicants has challenged the rejection of the claims under Section 112 by showing in the specification where light emitting efficiency is defined, but such Advisory Action fails to explain why such showing is not effective to overcome such rejection. In the absence of any such explanation, it is respectfully submitted that Applicant has effectively traversed the rejection, and reversal of such rejection on appeal is respectfully requested.

With respect to the rejection of Claims 9 and 10, Applicant's proposal to amend such claims in the proposed amendment after final mailed February 3, 2004 to be consistent with the express "efficiency" language of claims 1 and 5 was refused entry by the Examiner, with the explanation that such change would make little difference in the rejections or the analysis of the rejections. To the extent such comments reflect the Examiner's agreement with Applicant's comments set forth in the proposed amendment after final that the definition of "efficiency" as used in such claims is clear based on the specification, it is believed such rejection should be reversed with respect to claims 9 and 10 in addition to claims 1-8. Should the Examiner believe that such claims need to expressly state that "efficiency" as used therein relates to light emitting efficiency as used in claims 1 and 5 and as defined in the specification, Applicant should be allowed to amend Claims 9 and 10 as proposed

in the amendment after final which was refused entry, consistent with the other claims and specification. Reversal of this rejection is accordingly respectfully requested.

The Rejection of Claims 1, 4, 5 and 8-10 under 35 USC § 103

Claims 1, 4, 5, and 8-10 are rejected under 35 USC 103(a) as being unpatentable over Shimizu et al. (US 6,069,440), in view of Hill, Jr. (US 5,790,096), and Xu et al. (US 6,133,692). The Examiner states that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine a digital image processing circuit as taught by Hill, Jr. with the color electroluminescent display of Shimizu et al., and to further combine the organic electroluminescent devices for generating white light as taught by Xu with the color electroluminescent display as taught by Shimizu et al and Hill, Jr. Reversal of such rejection is respectfully urged, as the Examiner has failed to establish a prima facie case of obviousness, as there is no explanation provided as to how the prior art suggests combining such teachings in a manner which would result in Applicant's claimed invention.

With respect to claims 1, 4, 5, 8 and 10, none of the references, alone or in combination, teach, show or suggest a color organic electroluminescent display device employing in combination colored light emitting elements and white light emitting elements having light emitting efficiencies greater than the colored emitters, where the more efficient white emitters are selectively employed in the color display in order to save power when employing the OLED device, or where a color organic electroluminescent display includes means for displaying a monochrome portion of a color image using only white light emitting elements whereby power is saved.

With respect to claim 9, none of the references, alone or in combination, teach, show or suggest an organic electroluminescent (OLED) device comprising individually addressable colored light and white light emitting elements, where the white light emitting element is at least twice as efficient in emitting light than that of at least one of the colored light emitting elements.

Shimizu et al. disclose a white light emitting non-organic LED that includes an LED that emits one color of light and a phosphor over the LED that absorbs some of the emitted light and reemits another color of light, such that the

combination of directly emitted and reemitted light is white. At Col. 21, lines 3-31, Shimizu et al. disclose a monochrome display having the white light emitting diodes. Also, at Col. 22, lines 13-38, they disclose a color display composed of pixels having red, green, blue and white emitting LEDs. When displaying white light, the white emitting LEDs in the pixels are used (Col. 22, lines 32-35). With respect to claims 1, 4, 5, 8 and 10, as noted by the Examiner, Shimizu et al. do not suggest converting a portion of a color digital image signal to a monochrome image. Further, nowhere do Shimizu et al. teach show or suggest selectively employing white light emitting diodes which are more light emitting efficient than a colored light emitter in order to save power. With respect to claim 9, while such claim does not explicitly require means for displaying a converted image signal whereby power is saved, it does require the employment of more light emitting efficient white light elements in combination with individually addressable colored light emitting elements in an OLED device. Shimizu et al. is specifically directed towards the use of nitride compound semiconductors, and there is no suggestion to apply any teaching therein to organic electroluminescent devices. While Xu et al. does disclose a white light emitting OLED device, there is no suggestion or motivation to substitute such devices into the teaching of Shimizu et al., and to the contrary it appears to do so would defeat the purpose of the teachings of Shimizu et al., which are directed towards employing a combination of specific non-organic elements with phosphor elements to obtain a desired light output. Further, there is no teaching or suggestion in Xu et al. to selectively use such white light emitting devices in combination with individually addressable colored light emitting elements in a color display in order to save power.

The Examiner correctly points out that Hill Jr. discloses converting a color digital image to a monochrome image, but Hill Jr. only disclose using the monochrome image to drive a monochrome display in order to accommodate the limitations of the monochrome display, not to drive white light emitting elements of a color display in order to save power. Thus, even if the teachings of Shimizu et al., Hill Jr. and Xu et al. were to be combined as suggested by the Examiner, there is no suggestion in such references to combine such teachings in a manner which would result in Applicant's invention. The only combination which might be reasonably suggested by the teachings of Shimizu et al., Hill Jr. and Xu et al. would be to use

the monochrome image produced by Hill Jr. to drive a monochrome display (i.e., a display capable of producing an image in a single color only) comprised of white light emitting elements of the type disclosed by Shimizu et al. or Xu et al. Again, this would not result in Applicant's invention because there is no teaching in any of the references of providing a color organic electroluminescent display comprising both white light and colored light emitting elements, where the white light emitting elements are more efficient than the color elements of the display, and selectively driving the white light emitting elements of a color display with a color signal that has been converted to save power. It is believed therefore that Applicant's claims 1, 4, 5 and 8-10 are allowable over the combined teachings of Shimizu et al., Hill Jr. and Xu et al.

It is noted that the Examiner has apparently relied upon the differential sensitivity of the eye as a basis for meeting the claimed requirement that a more efficient white light emitting element be employed in combination with colored light emitters. As explained in the specification, however, the term efficiency as employed in the present claimed invention is specifically employed in reference to light emitting efficiency, not merely sensitivity of the eye. The Examiner's comments in the Advisory Action mailed March 4, 2004 also include a statement that Applicant has not addressed the prior office holding that Applicant has admitted in the specification that it is known in the art that a white OLED is at least twice as efficient as at least one of the other OLEDs and that it would have been obvious to use a white OLED having double the efficiency of a color OLED. Page 2, line 28 to page 3, line 3 referenced by the Examiner, however, only generally states that it is known that various colors of OLED materials do not create light with the same efficiencies, and then sets forth a requirement, for at least some of the claimed embodiments, that a white light emitting element employed be at least twice as efficient as blue and red light emitting elements. There is no admission in such section that it would have been obvious to selectively employ a relatively more efficient white light emitting element in combination with colored light emitting elements of a color OLED display to produce a converted color image signal (e.g., a monochrome gray scale image) in order to save power when displaying an image on the color display. Further, page 4, lines 20-25 of the specification referenced by the Examiner does disclose that it is known that the

luminance content of a colored scene can be represented by adding a weighted portion of each of the intensities of the red, green, and blue components of the image. This is similarly taught in Hill, Jr. as a possible way to best present a monochrome version of a color image on a monochrome display. What is not admitted, or taught in Hill, Jr. or any other cited art, is the use of a color weighted converted image signal selectively in combination with more efficient white light emitting elements to produce a converted image on a color display device for power consumption savings purposes. Absent such teaching or suggestion in the cited references, it is clear that the Examiner has reached a conclusion of obviousness only through the impermissible use of hindsight based on Applicant's teachings.

The Rejection of Claims 2 and 6 under 35 USC § 103

Claims 2 and 6 are rejected under 35 USC 103(A) as being unpatentable over Shimizu et al. (US 6,069,440), in view of Hill, Jr. (US 5,790,096), and Xu et al. (US 6,133,692) as applied to claims 1 or 5, and further in view of Shimoda (US 5,944,829). The Examiner states that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the power saving mode as taught by Shimoda with the color organic electroluminescent display as taught by Shimizu et al., Hill, Jr., and Xu. Reversal of such rejection is respectfully urged, as Shimoda fails to add any teaching or suggestion which overcomes the basic deficiencies of the primary references discussed above with respect to establishing a prima facie case of obviousness. Specifically, while Shimoda teaches methods and devices for power conservation to optimize battery life in a portable computer system, the only disclosed embodiments are directed towards software application operating characteristics, and there is no teaching or suggestion to employ any of such energy conservation techniques in combination with a converted display signal selectively employed with more efficient white light emitting elements of an organic electroluminescent display in order to conserve power consumption by a display device. Reversal of the rejection of claims 2 and 6 is accordingly respectfully requested.

The Rejection of Claims 3 and 7 under 35 USC § 103

Claims 3 and 7 are rejected under 35 USC 103(a) as being unpatentable over Shimizu et al. (US 6,069,440), in view of Hill, Jr. (US 5,790,096), and Xu et al. (US 6,133,692), and further in view of Nelson et al. (US 6,311,282 B1). The Examiner states that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the battery saving mode switch as taught by Nelson et al. with the color organic electroluminescent display as taught by Shimizu et al., Hill, Jr., and Xu. Reversal of such rejection is respectfully urged, as Nelson et al. fails to add any teaching or suggestion which overcomes the basic deficiencies of the primary references discussed above with respect to establishing a prima facie case of obviousness. Specifically, while Nelson teaches method and apparatus for computing device with integrated paging receiver and "suspend/resume" button for power conservation, there is no teaching or suggestion to employ such button in combination with a converted display signal selectively employed with more efficient white light emitting elements of an organic electroluminescent display in order to conserve power consumption by a display device. Reversal of the rejection of claims 3 and 7 is accordingly respectfully requested.

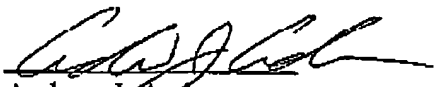
Summary

Claims 1-10 particularly point out and distinctly claim the subject matter which applicant regards as the invention, and none of the references, alone or in combination, teach, show or suggest a color display device employing in combination colored light emitting elements and white light emitting elements having light emitting efficiencies greater than the colored emitters, where the more efficient white emitters are selectively employed in the color display in order to save power when employing the OLED device. The claims are thus believed patentable over the cited art.

Conclusion

For the above reasons, Appellants respectfully request that the Board of Patent Appeals and Interferences reverse the rejection by the Examiner and mandate the allowance of Claims 1-10.

Respectfully submitted,



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Appendix I - Claims on Appeal

1. A method of saving power in a color organic electroluminescent display of the type having color emitting elements with different light emitting efficiencies, comprising the steps of:

a) providing an organic electroluminescent color display having colored light emitting elements and white light emitting elements having light emitting efficiencies greater than at least one of the colored light emitting elements;

b) converting at least a portion of a color digital image to be displayed on the display to a monochrome image; and

c) displaying the monochrome image portion using only the white light emitting elements whereby power is saved.

2. The method claimed in claim 1, wherein the display is in a battery powered device, and further comprising the step of monitoring the power level of the battery, and converting to a power saving mode of operation when the battery power reaches a predetermined level.

3. The method claimed in claim 1, further comprising the steps of: providing a battery saving mode switch on a device that includes the color organic electroluminescent display, and switching to a battery saving mode using the mode switch.

4. The method claimed in claim 1, wherein the step of converting a color digital image to a monochrome digital image comprises combining 5/16, 9/16, and 2/16 of the red, green and blue color signals, respectively.

5. A color organic electroluminescent display, comprising:

a) a plurality of differently colored light emitting elements having different light emitting efficiencies and white light emitting elements having light emitting efficiencies greater than at least one of the colored light emitting elements;

b) a digital image processing circuit for converting at least a portion of a color digital image to be displayed on the display to a monochrome image; and

c) means for displaying the monochrome portion of the image using only the white light emitting elements whereby power is saved.

6. The display claimed in claim 5, wherein the display is in a battery powered device, and further comprising a power monitor for monitoring the power level of the battery, and a control circuit connected to power monitor for converting the display to a power saving mode of operation when the battery power reaches a predetermined level.

7. The display claimed in claim 5, further comprising a battery saving mode switch connected to the control circuit for switching to a battery saving mode.

8. The display claimed in claim 5, wherein the digital image processing circuit converts a color digital image to a monochrome digital image by combining 5/16, 9/16, and 2/16 of the red, green and blue color signals, respectively.

9. An OLED device, comprising:

a) a pixel site including a plurality of individually addressable light emitting elements including a light emitting element for emitting white light and one or more light emitting elements for emitting colored light; and

b) the white light emitting element being at least twice as efficient as at least one of the colored light emitting elements.

10. A method of saving power in an OLED display device, comprising:

a) providing an OLED display having pixel sites with colored light emitting elements and white light emitting elements, the white light emitting element being at least twice as efficient as at least one of the colored light emitting elements;

b) converting at least a portion of a digital color image signal to a power saving digital image signal using the white light emitting elements; and

c) driving the OLED display with the power saving digital image signal.